

U.S. Appln. No. 09/604,285 - GATTO et al.

IN THE CLAIMS:

Theses reissue claims presented replace all prior listings of claims.

22. (Amended) A lubricating composition comprising:

a major amount of lubricating oil,

at least one oil soluble molybdenum compound that is free of phosphorus and free of active sulfur, and

at least one oil soluble secondary diarylamine,

wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diarylamine is about 0.02 to 0.6 parts by weight molybdenum per part of said secondary diarylamine, said oil soluble secondary diarylamine is present in an amount of about 750 to about 5,000 parts per million of said lubricating composition, said oil soluble molybdenum compound and said secondary diarylamine are present in an effective antioxidant amount, provided said oil soluble molybdenum compound is present in an amount so as to provide greater than about 100 ppm molybdenum based on the weight of said lubricating composition.

23. (Amended) A lubricating composition comprising:

a major amount of lubricating oil,

at least one oil soluble molybdenum compound that is free of phosphorus and free of active sulfur, and

at least one oil soluble secondary diarylamine,

wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diarylamine is about 0.02 to 0.6 parts by weight molybdenum per part of said secondary diarylamine, said oil soluble molybdenum compound is present in an amount to provide about 100 to 450 parts per million of molybdenum based on the weight of said lubricating composition, provided said oil soluble secondary diarylamine is present in an amount equal to, or greater than, from about 750 ppm based on the weight of said lubricating composition.

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24. (Canceled)

25. (Previously pending) A lubricating composition according to claim 23, wherein the amount of said secondary diarylamine is about 750 to 5,000 parts per million of said lubricating composition.

26. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the amount of said oil soluble secondary diarylamine is from 1,000 to 4,000 parts per million.

27. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the amount of said oil soluble secondary diarylamine is from 1,200 to 3,000 parts per million.

28. (Previously pending) A lubricating composition according to claim 22 or 23, wherein molybdenum is present from about 0.040 to 0.4 parts by weight molybdenum relative to said oil soluble secondary diarylamine.

29. (Previously pending) A lubricating composition according to claim 22 or 23, wherein molybdenum is present from about 0.05 to 0.3 parts by weight of molybdenum relative to said oil soluble secondary diarylamine.

30. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the molybdenum compound is at least one of molybdenum naphthenate, molybdenum octoate or molybdenum 2-ethylhexanoate.

31. (Amended) A lubricating composition according to claim 22 or 23, wherein the quantity of molybdenum is from 100 to 250 parts per million (by weight).

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32. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the quantity of molybdenum is from 125 to 250 parts per million (by weight).

33. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the molybdenum compound is a molybdenum carboxylate.

34. (Amended) A lubricating composition according to claim 33, wherein the carboxylate has from 4 to 30 carbon atoms.

35. (Previously pending) A lubricating composition according to claim 33, wherein the molybdenum carboxylate is that of an aliphatic or cycloaliphatic acid having from 4 to 18 carbon atoms.

36. (Previously pending) A lubricating composition according to claim 33, wherein the carboxylate is that of a monocarboxylic aliphatic or cycloaliphatic acid having an alkyl group of from 6 to 18 carbon atoms.

37. (Amended) A lubricating composition according to claim 33, wherein the carboxylate is that of a fatty acid.

38. (Previously pending) A lubricating composition according to claim 37, wherein the fatty acid has 6 to 14 carbon atoms.

39. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said oil soluble molybdenum compound is obtained from a molybdenum source and an active hydrogen compound, said molybdenum source is selected from the group consisting of ammonium molybdates, molybdenum trioxide, and molybdenum acetylacetonates, and said active hydrogen compound is selected from the group consisting of alcohols, polyols, primary amines, secondary amines, polyamines, phenols, ketones, and anilines.

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40. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said oil soluble molybdenum compound is at least one glycol molybdenum complex.

41. (Canceled)

42. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said oil soluble molybdenum compound is at least one organic amide molybdenum complex.

43. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said oil soluble molybdenum compound is a molybdenum complex obtained by reacting a fatty oil, diethanolamine and molybdenum source.

44. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said oil soluble molybdenum compound is obtained by reacting a molybdenum source with a fatty acid and a 2-(2-aminoethyl)aminoethanol.

45. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the secondary diarylamine has from 6 to 30 carbon atoms in each of the aryl groups.

46. (Previously pending) A lubricating composition according to claim 22 or 23, wherein the secondary diarylamine is of the formula:



wherein R¹ and R² each independently represent an aryl group having from 6 to 30 carbon atoms.

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47. (Previously pending) A lubricating composition according to claim 46, wherein at least one of said aryl groups has from 7 to 20 carbon atoms.

48. (Previously pending) A lubricating composition according to claim 46, wherein each of the aryl groups of the amine is selected from phenyl, naphthyl, alkphenyl and alknaphthyl wherein the alkyl portion has from 4 to 18 carbon atoms.

49. (Previously pending) A lubricating composition according to claim 46, wherein both aryl groups are alkaryl having from 7 to 20 carbon atoms.

50. (Amended) A lubricating composition according to claim 46, wherein each aryl group is alkphenyl having from 4 to 18 carbon atoms in each alkyl group.

51. (Previously pending) A lubricating composition according to claim 22 or 23, wherein said lubricating composition further comprises at least one of the following additives: a dispersant; a detergent; and a zinc dihydrocarbyl dithiophosphate.

52. (Previously pending) A method for improving the antioxidancy and friction properties of a lubricant adapted for use in lubricating an internal combustion engine which method comprises including in the lubricant a molybdenum compound which is free of phosphorus and is free of active sulfur, said molybdenum compound providing about 100 to 450 parts per million of molybdenum to the lubricant and about 750 to 5000 parts per million of an oil soluble secondary diarylamine.

53. (Canceled)

54. (Canceled)

55. (Canceled)

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56. (Previously pending) A method for lubricating an engine comprising adding a lubricating composition of claim 22 or claim 23 to said engine.

57. (Previously pending) An engine lubricated according to the method of claim 56.

58. (Previously pending) A lubricating composition according to claim 22, wherein said oil soluble molybdenum compound is a molybdenum carboxylate or an organic amide molybdenum complex.

59. (Previously pending) A lubricating composition according to claim 22, wherein said oil soluble molybdenum compound provides greater than about 104 ppm of molybdenum.

60. (Previously pending) A lubricating composition according to claim 22, wherein said oil soluble molybdenum compound provides greater than 156 ppm molybdenum.

61. (Previously pending) A lubricating composition according to claim 22, wherein said oil soluble molybdenum compound provides 468 ppm molybdenum.

62. (Previously pending) A lubricating composition according to claim 22, wherein said lubricating composition is free of a supplemental antioxidant selected from the group consisting of sulfurized phenols, sulfurized olefins, dialkyl dithiocarbamates, and phenothiazines.

63. (Previously pending) A lubricating composition according to claim 23, wherein said lubricating composition is free of a supplemental antioxidant selected from the group consisting of sulfurized phenols, sulfurized olefins, dialkyl dithiocarbamates, and phenothiazines.

64. (Currently Amended) A lubricating composition comprising:

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a major amount of lubricating oil,

at least one oil soluble molybdenum carboxylate compound that is free of phosphorus and free of active sulfur and provides about 104 to 468 ppm of molybdenum based on the weight of the lubricating composition, wherein the carboxylate anion has from 4 to 30 carbon atoms,

at least one oil soluble secondary diarylamine comprising an alkylated diphenyl amine,

wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diaryl amine is about 0.02 to 0.6 parts by weight molybdenum per part of said secondary diarylamine, and provided said oil soluble secondary diarylamine is present in an amount equal to, or greater than, about 750 ppm based on the weight of said lubricating composition.

65. (Previously pending) A lubricating composition according to claim 64, wherein said oil soluble molybdenum compound provides between 104 and 156 ppm of molybdenum.

66. (Previously pending) A lubricating composition according to claim 64, wherein said oil soluble molybdenum compound provides 468 ppm molybdenum.

67. (Previously pending) A lubricating composition according to claim 64, wherein said lubricating composition is free of a supplemental antioxidant selected from the group consisting of sulfurized phenols, sulfurized olefins, dialkyl dithiocarbamates, and phenothiazines.

68. (Previously pending) A lubricating composition according to claim 64, wherein the molybdenum compound is at least one of molybdenum naphthenate, molybdenum octoate or molybdenum 2-ethylhexanoate.

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69. (Previously pending) The lubricating composition according to claim 64, wherein the amount of molybdenum is up to about 450 ppm.

70. (Previously pending) The lubricating composition according to claim 64, wherein the amount of molybdenum is from 125 ppm to 250 ppm.

71. (Previously pending) The lubricating composition according to claim 64, wherein said oil soluble secondary diarylamine is present in an amount of about 750 to about 5,000 parts per million of said lubricating composition.

72. (Previously pending) The lubricating composition according to claim 64, wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diaryl amine is about 0.04 to 0.4 parts by weight molybdenum per part of said secondary diarylamine.

73. (Previously pending) The lubricating composition according to claim 64, wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diaryl amine is about 0.05 to 0.3 parts by weight molybdenum per part of said secondary diarylamine.

74. (Previously pending) A method for lubricating an internal combustion engine comprising adding a lubricating composition of claim 64 to said engine.

75. (Amended) An internal combustion engine lubricated according to the method of claim 74.

76. (Previously pending) A lubricating composition consisting essentially of:
a major amount of lubricating oil; and
an antioxidant combination that consists essentially of:

at least one oil soluble molybdenum compound that is free of phosphorus and

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free of active sulfur, and
at least one oil soluble secondary diarylamine,
wherein the ratio of molybdenum provided by said oil soluble molybdenum compound
relative to said oil soluble secondary diarylamine is about 0.02 to 0.6 parts by weight
molybdenum per part of said secondary diarylamine, said oil soluble secondary diarylamine
is present in an amount of about 750 to about 5,000 parts per million of said lubricating
composition, provided said oil soluble molybdenum compound is present in an amount so as
to provide greater than about 100 ppm molybdenum based on the weight of said lubricating
composition.

77. (Previously pending) The lubricating composition according to claim 76,
wherein said oil soluble secondary diarylamine consists essentially of an alkylated diphenyl
amine.

78. (Previously pending) The lubricating composition according to claim 76, wherein
in said oil soluble molybdenum compound is a molybdenum carboxylate compound in
which the carboxylate anion has from 4 to 30 carbon atoms.

79. (Previously pending) The lubricating composition according to claim 76, wherein
said oil soluble secondary diarylamine is present in an amount of about 1,000 to 4,000 parts
per million.

80. (Previously pending) The lubricating composition according to claim 79, wherein
said oil soluble secondary diarylamine is present in an amount of 1,200 to 3,000 parts per
million.

81. (new) A lubricating composition comprising:
a major amount of lubricating oil,
at least one oil soluble molybdenum compound that is free of phosphorus and free of
active sulfur, and

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at least one oil soluble secondary diarylamine,

wherein the ratio of molybdenum provided by said oil soluble molybdenum compound relative to said oil soluble secondary diarylamine is about 0.02 to 0.6 parts by weight molybdenum per part of said secondary diarylamine, wherein said oil soluble molybdenum compound is present in an amount to provide greater than about 100 parts per million of molybdenum based on the weight of said lubricating composition, provided said oil soluble secondary diarylamine is present in an amount up to 5,000 ppm based on the weight of said lubricating composition.